

REMARKS

Claims 13, 16 to 22, 24, and 25, as amended, and new claims 26 to 30 appear in this application for the Examiner's review and consideration. Claims 15 and 23 are canceled by this Amendment without prejudice to Applicants right to file one or more continuation or divisional applications directed to the subject matter of those claims. The new claims and the amendments are fully supported by the specification and claims as originally filed. Therefore, there is no issue of new matter.

Rejection under 35 U.S.C. § 112, first paragraph

Claims 17 and 23 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement, for the reasons set forth on pages 2 and 3 of the Final Office Action. In particular, the Final Office Action states that there is neither an adequate description nor enabling disclosure for the limitation, "the lattice reinforcing device does not have an arrangement for holding nuclear fuel rods." The Final Office Action further states that, as illustrated in Figure 3, as many as four rods are enclosed, i.e., held, within lattice reinforcement 21, when used in the fuel assembly.

In response, Applicants submit that, in light of the present specification, one of ordinary skill in the art would understand that it is the spacer grids of the nuclear fuel assemblies of the invention that hold the fuel rods, not the lattice reinforcing device. Paragraphs [0002] to [0005], [0011], [0022], and [0040] to [0046] of U.S. Patent Application Publication No. 2007/0076840 ("the '840 publication"), the publication of the present application, clearly teach that it is the spacer grids of the nuclear fuel assemblies of the invention that hold the fuel rods. All references herein to paragraphs of the specification of the present application refer to the paragraphs of the '840 publication.

In particular, paragraph [0046] of the '840 publication teaches

As can be seen in FIG. 3, in which a spacer grid 13 is drawn in dashed lines, each spacer grid 13 comprises, for example, two sets of crossed plates 15 and a peripheral belt 17 surrounding the peripheral layer 19 of rods 3. The grid 13 defines cells 20, most of which receive a respective rod 3. Bosses (not shown) are provided in the plates 15 to press against the rods 3 and hold them at the nodes of the array. Each of the other cells 20 receives a guide tube 11.

Therefore, one of ordinary skill in the art would clearly understand that bosses on the plates 15 press against the fuel rods 3, holding the fuel rods at the nodes of the array.

Those skilled in the art will also understand that the lattice reinforcing device of the presently claimed invention is distinct from the spacer grid 13 in light of the claims and the specification. The claims recite the lattice reinforcing device and spacer grids as two different elements of the claimed invention.

In addition, Figure 3 and the text in the specification describing Figure 3 distinguish the lattice reinforcing device from the spacer grids 13, and clearly enable one of ordinary skill in the art to make and use the presently claimed invention, where the lattice reinforcing device does not have an arrangement for holding nuclear fuel rods. The cells of the lattice are of dimensions that are greater than the dimensions of the fuel rods, thereby surrounding the fuel rods with clearance. As a result, the lattice reinforcing device does not have any arrangement for holding the fuel rods. *See* page 2 of the ‘840 publication.

In particular, starting at paragraph [0049] of the ‘840 publication, the present specification describes the lattice reinforcing device of the presently claimed invention, as follows:

At paragraph [0049], the ‘840 publication states that “[i]n the invention, between the spacer grid 13, the assembly 1 includes intermediate devices 21 for reinforcing the skeleton 5.”

As illustrated in Figure 3, the intermediate reinforcing device 21 is provided between each pair of spacer grids 13. The ‘840 publication, paragraph [0051].

“The device 21 comprises two sets of crossed plates 23 that are secured to one another, e.g. by welding at their points of intersection.” The ‘840 publication, paragraph [0053].

The plates 23 define cells 25 between the plates 23 and cells 27. Each of the cells 25 is configured to receive a guide tube 11, and each of the cells 27 is configured to receive fuel rods 3. As illustrated in Figure 3, some of cells 27 receive only one fuel rod 3, and other cells receive two or four fuel rods 3. The ‘840 publication, paragraph [0054].

As disclosed in paragraph [0043] of the ‘840 publication, the guide tubes 11 receive the rods of a control or shutdown cluster. Thus, as illustrated in Figure 3, the guide tubes 11 are not fuel rods, and do not receive fuel rods.

The plates 23 of the intermediate reinforcing device 21 form a lattice structure that extends solely between the guide tubes 11, and forms an openwork structure. The ‘840 publication, paragraph [0055].

Therefore, the lattice reinforcing device is not the spacer grid 13.

The lattice reinforcing device of the invention is further described in the ‘840 publication, as follows:

The extent of the plates 23 and the reinforcing device 21 is limited, as the plates 23 do not extend between the fuel rods 3 of the outer peripheral layer 19 of fuel rods 3, or between the layer 19 and layer 29, such that the reinforcing device 21 stops near layer 29. Paragraph [0056]. Layers 19 and 29 are defined in paragraph [0046].

As stated in paragraph [0057]:

The plates 23 do not have any arrangement for holding the rods 3, and as a result the cells 27 are of dimensions that are greater than the dimensions of the rods 3, thereby surrounding them with clearance.

Therefore, those skilled in the art will understand from the present specification that the cells 27 formed by the lattice of device 21 are greater in size than the fuel rods 3. The cells 27 surround the fuel rods, but there is clearance between the plates 23 and the fuel rods 3. As there is clearance between the plates 23 and the fuel rods 3, the lattice 21 does not have an arrangement for holding the nuclear fuel rods 3.

It is well settled law that Applicants can be their own lexicographers. All that is required is that one of ordinary skill in the art will understand the term in light of the specification. In the present application, the term “does not have an arrangement for holding the nuclear fuel rods” will be understood clearly by those skilled in the art to mean that the lattice can surround the fuel rods, but does not hold the fuel rods, as there is clearance between the plates 23 and the fuel rods 3.

As the term “does not have an arrangement for holding the nuclear fuel rods” will be understood by those skilled in the art to mean that the lattice surrounds the fuel rods with clearance, and the specification clearly describes how to obtain the claimed arrangement, the present claims are fully enabled by the specification.

Therefore, as one of ordinary skill in the art will understand how to make and use the presently claimed invention in light of the present specification, the specification and claims meet the enablement requirement. Accordingly, it is respectfully requested that the Examiner withdraw the rejection of claims 17 and 23 under 35 U.S.C. § 112, first paragraph.

Rejections under 35 U.S.C. § 102(b)

Claims 13, 20 and 21 stand rejected under 35 U.S.C. § 102(b), as being anticipated by any one of U.S. Patent No. 6,744,842 to Schmidt et al. (Schmidt) or U.S. Patent No. 4,576,786 to DeMario or U.S. Patent No. 5,263,072 to Canat et al. (Canat), for the reasons set forth on pages 3 and 4 of the Final Office Action;

Claims 15 and 22 stand rejected under 35 U.S.C. § 102(b), as being anticipated by either of DeMario or Canat, for the reasons set forth on page 5 of the Final Office Action;

Claim 16 stands rejected under 35 U.S.C. § 102(b), as being anticipated by either of Schmidt or Canat, for the reasons set forth on page 5 of the Final Office Action;

Claims 18 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by either of Schmidt or DeMario, for the reasons set forth on page 5 of the Final Office Action; and

Claims 17, 19, 23 and 25 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Canat, for the reasons set forth on page 5 of the Final Office Action.

Independent Claim 13

In response, Applicants submit that the presently claimed invention is directed to a pressurized water reactor (“PWR”) nuclear fuel assembly. As recited in independent claim 13, the presently claimed PWR nuclear fuel assembly comprises nuclear fuel rods disposed in a substantially regular array, a supporting skeleton having two nozzles, guide tubes for receiving control rods, the guide tubes interconnecting the nozzles, and spacer grids for holding the fuel rods, where the grids are secured to the guide tubes. The assembly further comprises at least one lattice reinforcing device for reinforcing the support skeleton. The lattice reinforcing device is disposed between two spacer grids, and is secured to the guide tubes. The array of fuel rods has a peripheral layer of fuel rods constituting a closed loop and an adjacent layer of fuel rods, where the adjacent layer constitutes a closed loop of fuel rods adjacent to and surrounded by the peripheral layer. The lattice reinforcing device does not extend between the fuel rods of the peripheral layer and between the fuel rods of the adjacent layer.

In contrast to the presently claimed invention, Schmidt discloses a fuel assembly for a PWR that has a grid insert 16a. The grid insert 16a extends between the fuel rods of the layer of rods adjacent to the peripheral layer of fuel rods. Therefore, Schmidt does not disclose a lattice reinforcing device that does not extend between the fuel rods of a

peripheral layer and between the fuel rods of a layer adjacent to the peripheral layer, as presently claimed in independent claim 13.

DeMario discloses a partial grid 24 for a nuclear fuel assembly. As illustrated in Figure 2, the partial grid 24 extends between the fuel rods 18 on at least two sides of the assembly 10. As discussed above, independent claim 13 recites that the peripheral layer of fuel rods constitutes a closed loop. As DeMario discloses a partial grid 24 that extends between the fuel rods 18 on at least two sides of the assembly 10, DeMario discloses a grid that extends between the fuel rods of a peripheral layer of fuel rods. DeMario does not disclose a lattice reinforcing device that does not extend between the fuel rods of a peripheral layer and between the fuel rods of a layer adjacent to the peripheral layer, as presently claimed in independent claim 13.

Canat discloses a thermohydraulic grid and nuclear fuel assembly. As illustrated in Figure 2 and cited in the Final Office Action, the assembly includes brackets 56 welded to a sleeve. Applicants submit that the grid and positions of the brackets 56 are symmetrical around the vertical dotted line in Figure 2. Each set of brackets extends between a portion of a peripheral layer of fuel rods of the disclosed assembly. As the grid and positions of the brackets 56 are symmetrical around the vertical dotted line in Figure 2, brackets 56 extend between fuel rods of the peripheral layer of fuel rods on each side of the grid. Moreover, as discussed above, independent claim 13 recites a peripheral layer of fuel rods constituting a closed loop. Therefore, any bracket of the assembly disclosed by Canat that extends between any fuel rods of a peripheral layer is outside the scope of present claim 13.

Independent Claim 20

As recited in independent claim 20, the presently claimed PWR nuclear fuel assembly comprises nuclear fuel rods, a supporting skeleton having two nozzles, guide tubes for receiving control rods, the guide tubes interconnecting the nozzles, and spacer grids for holding the fuel rods, where the grids are secured to the guide tubes. The assembly further comprises at least one lattice reinforcing device for reinforcing the support skeleton. The lattice reinforcing device is disposed between two spacer grids, and is secured to the guide tubes. The lattice reinforcing device does not have an arrangement for mixing a cooling fluid that is to flow through the nuclear fuel assembly, and the lattice reinforcing device does not have an arrangement for holding nuclear fuel rods.

In contrast, Schmidt discloses the insert 16a, which is part of a spacer 10. Column 4, lines 45 to 48. As illustrated in Figure 9, spacers 10, including insert 16a, are arranged to hold the fuel rods. The spacers 10 and also the entire outer contour of the fuel assembly are substantially square in cross section and have a multiplicity of cells 13. The fuel rods 9 and control rod guide tubes 12 pass through the cells 13, and bosses 14 and springs 21 project inwards from the walls of each cell to fix the fuel rods. Column 4, lines 37 to 44. Therefore, Schmidt does not disclose a lattice reinforcing device that does not have an arrangement for holding nuclear fuel rods, as presently claimed.

Similarly, DeMario discloses a partial grid that holds the fuel rods. At column 10, lines 2 to 9, DeMario discloses that each of the cells of the partial grid is associated with rigid and resilient means, of a conventional construction, formed integrally thereon. The means project into each opening through which a fuel rod passes, and support the fuel rods against lateral displacement and, to a given extent, frictionally against longitudinal movement. The rigid means include two longitudinally spaced rigid projections that engage the fuel rod on one side. The resilient means include a spring finger that engages the fuel rod on the side directly opposite to the rigid projections, at a longitudinal point, preferably, midway between the rigid projections. Another identical set of lateral supports are formed on the other two straps that form the opening to support the fuel rods at the same longitudinal location, but substantially perpendicular to the first set of lateral supports. This provides a six-point lateral support for each fuel rod at each opening through which the fuel rod passes. Therefore, DeMario does not disclose a lattice reinforcing device that does not have an arrangement for holding nuclear fuel rods, as presently claimed.

Canat discloses a thermohydraulic mixing grid for a nuclear fuel assembly. The thermohydraulic mixing grid is designed to improve the mixing of the streams of coolant circulating in the assembly and to homogenize temperatures. Column 1, lines 6 to 10. Therefore, Canat does not disclose a lattice reinforcing device that does not have an arrangement for mixing a cooling fluid that is to flow through the nuclear fuel assembly.

New Independent Claim 26

As recited in new independent claim 26, the presently claimed PWR nuclear fuel assembly comprises nuclear fuel rods disposed in a substantially regular array, the array having a peripheral layer of fuel rods constituting a closed loop, a supporting skeleton having two nozzles, guide tubes for receiving control rods, the guide tubes interconnecting

the nozzles, and spacer grids for holding the fuel rods, where the grids are secured to the guide tubes. The assembly further comprises at least one lattice reinforcing device for reinforcing the support skeleton. The lattice reinforcing device is disposed between two spacer grids, and is secured to the guide tubes. The lattice reinforcing device does not extend between the fuel rods of the peripheral layer, and the lattice reinforcing device does not have an arrangement for holding nuclear fuel rods.

As discussed above, Schmidt and DeMario disclose grids that hold the fuel rods. Therefore, Schmidt and DeMario do not disclose a lattice reinforcing device that does not have an arrangement for holding nuclear fuel rods, as presently claimed.

As also discussed above, Canat discloses a grid that extends between the fuel rods of the continuous loop of a peripheral layer. Moreover, the grid and positions of the brackets 56 are symmetrical around the vertical dotted line in Figure 2, as cited in the Final Office Action, and, thus, brackets 56 extend between fuel rods of the peripheral layer of fuel rods on each side of the grid. Therefore, Canat does not disclose a lattice reinforcing device that does not extend between the fuel rods of a peripheral layer, as presently claimed.

Therefore, as Schmidt, DeMario, and Canat each fail to disclose the presently claimed invention, the present claims are not anticipated by those references. Accordingly, it is respectfully requested that the Examiner withdraw the rejections of the claims under 35 U.S.C. § 102(b) over Schmidt, DeMario, and Canat.

Applicants thus submit that the entire application is now in condition for allowance, an early notice of which would be appreciated. Should the Examiner not agree with Applicants' position, a personal or telephonic interview is respectfully requested to discuss any remaining issues prior to the issuance of a further Office Action, and to expedite the allowance of the application.

No fee is believed to be due for the filing of this Amendment. Should any fees be due, however, please charge such fees to Deposit Account No. 11-0600.

Respectfully submitted,
KENYON & KENYON LLP

Dated: February 1, 2008

By: Alan P. Force
Alan P. Force
Reg. No. 39,673
One Broadway
New York, NY 10004
(212) 425-7200

the nozzles, and spacer grids for holding the fuel rods, where the grids are secured to the guide tubes. The assembly further comprises at least one lattice reinforcing device for reinforcing the support skeleton. The lattice reinforcing device is disposed between two spacer grids, and is secured to the guide tubes. The lattice reinforcing device does not extend between the fuel rods of the peripheral layer, and the lattice reinforcing device does not have an arrangement for holding nuclear fuel rods.

As discussed above, Schmidt and DeMario disclose grids that hold the fuel rods. Therefore, Schmidt and DeMario do not disclose a lattice reinforcing device that does not have an arrangement for holding nuclear fuel rods, as presently claimed.

As also discussed above, Canat discloses a grid that extends between the fuel rods of the continuous loop of a peripheral layer. Moreover, the grid and positions of the brackets 56 are symmetrical around the vertical dotted line in Figure 2, as cited in the Final Office Action, and, thus, brackets 56 extend between fuel rods of the peripheral layer of fuel rods on each side of the grid. Therefore, Canat does not disclose a lattice reinforcing device that does not extend between the fuel rods of a peripheral layer, as presently claimed.

Therefore, as Schmidt, DeMario, and Canat each fail to disclose the presently claimed invention, the present claims are not anticipated by those references.

Accordingly, it is respectfully requested that the Examiner withdraw the rejections of the claims under 35 U.S.C. § 102(b) over Schmidt, DeMario, and Canat.

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KENYON & KENYON LLP

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By: Alan P. Force
Alan P. Force
Reg. No. 39,673
One Broadway
New York, NY 10004
(212) 425-7200